(No Model.) 2 Sheets—Sheet 1.

G. W. COY.

SIGNALING MECHANISM FOR TELEPHONE EXCHANGE SYSTEMS.

No. 265,028. Patented Sept. 26, 1882.

Fig. 1.

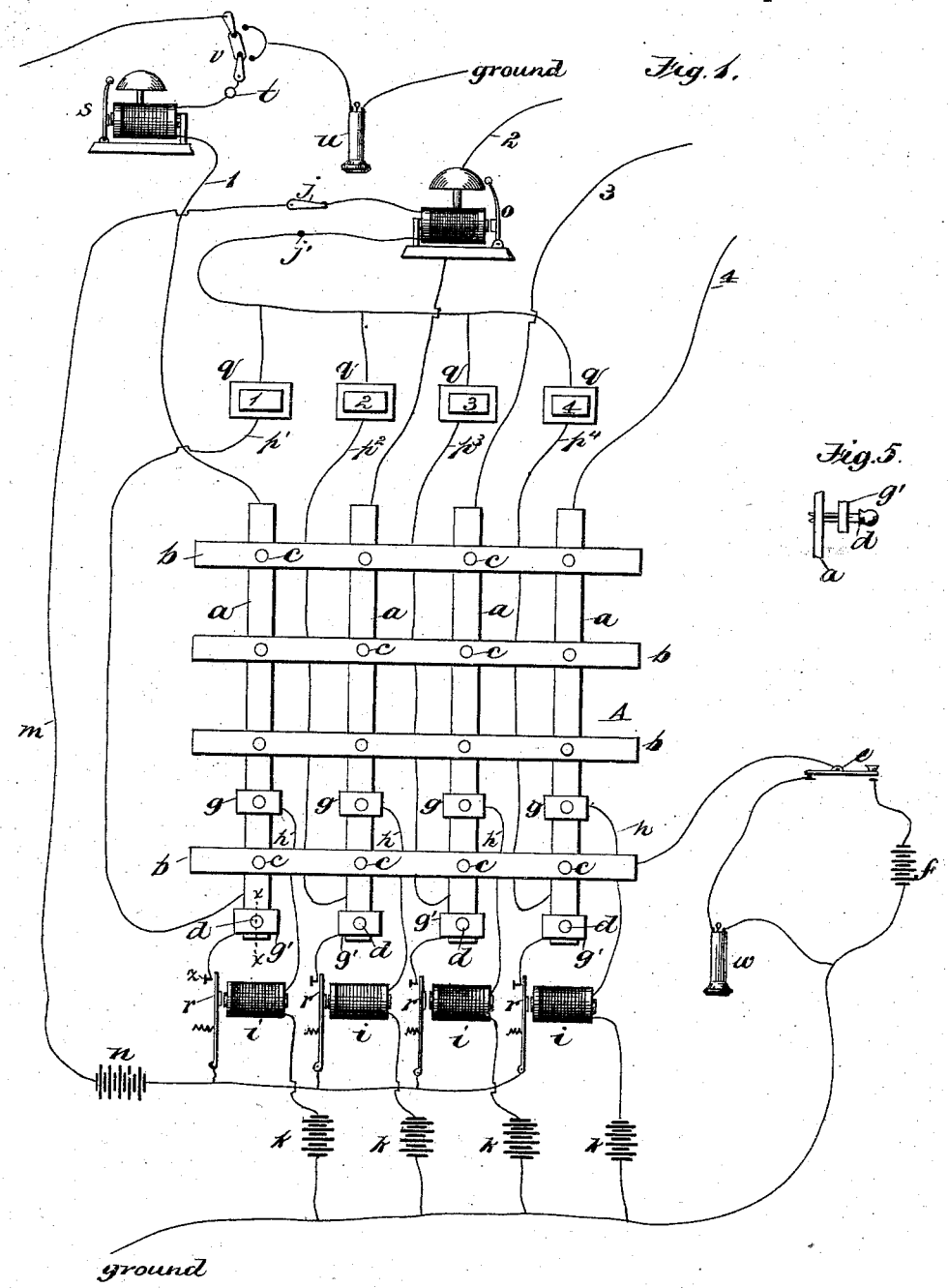

Fig. 5.

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(No Model.)

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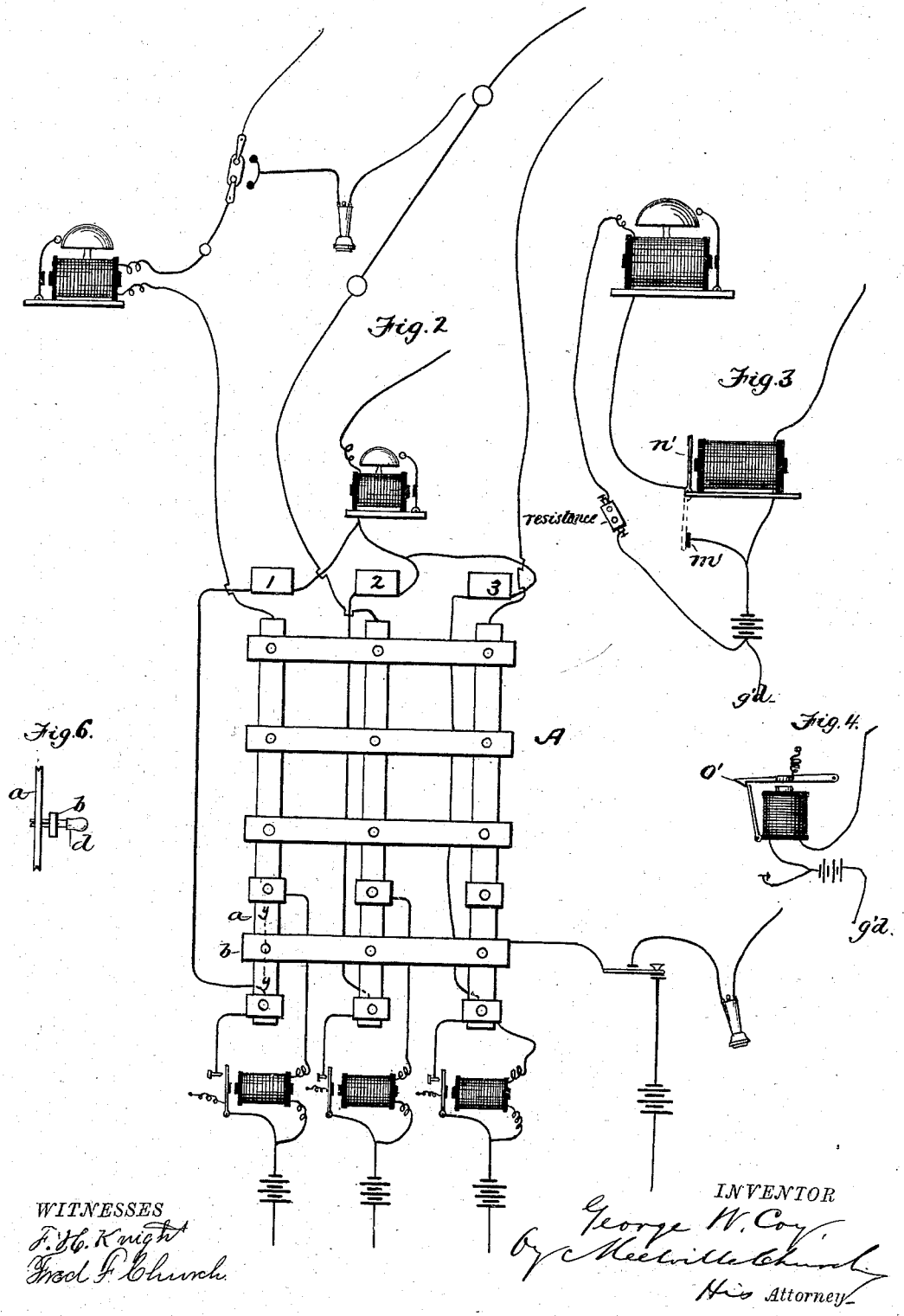

WITNESSES
F. H. Knight
Fred'k P. Church

INVENTOR
George W. Coy
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UNITED STATES PATENT OFFICE.

GEORGE W. COY, OF MILFORD, CONNECTICUT.

SIGNALING MECHANISM FOR TELEPHONE-EXCHANGE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 265,028, dated September 26, 1882.

Application filed May 3, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. COY, of Milford, in the county of New Haven and State of Connecticut, have invented certain Improvements in Signaling Mechanism for Telephone-Exchange Systems; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is diagram representing a telephone-exchange system embodying my invention. Fig. 2 is a similar diagram, showing a modified form of my invention; and Figs. 3 and 4 are views illustrating different forms of annunciator. Fig. 5 is a sectional view taken on the line *x x*, Fig. 1; and Fig. 6 is a similar view taken on the line *y y*, Fig. 2.

Similar letters of reference in the several figures denote the same parts.

My invention relates to improvements in telephone-exchange systems, and has for its object to improve the means employed for transmitting signals to and from a central station.

To this end the invention consists primarily in the combination of a series of subscribers' stations centering at a central station, and each containing a relay, with signaling devices in a local circuit operated by the relay, and switch devices for connecting any two subscribers' circuits for oral communication.

It further consists of a series of subscribers' circuits centering at a central station, and each containing a relay, with signaling devices in the local circuit operated by the relay, and means for transmitting outgoing signals over the subscribers' lines without disturbing the signal-receiving devices at the central station; and it further consists in the several combinations and sub-combinations, which I will hereinafter describe, and point out in the claims.

Referring to the drawings, A represents a simple form of switch-board forming part of the equipment of a central station in a telephone system, and consisting of a series of conducting-strips, *a*, and another series of conducting-strips, *b*, arranged at right angles thereto, but not in electrical contact therewith.

1 2 3 4 represent a series of subscribers' lines centering at the central station, and each connected to a separate conducting-strip, *a*, of the switch-board. Perforations *c* are made through the strips *a* and *b* at their points of intersection, and into these perforations conducting plugs or pegs *d* are adapted to be inserted, so as to connect any two strips *a* with a common strip, *b*, and thus put any two subscribers' circuits into connection for oral communication, or so as to connect any strip *a* with the bottom strip, *b*, for the purpose of sending an outgoing signal to the subscriber so connected by means of a signaling-key, *e*, or other signaling mechanism connected to said bottom strip, *b*, and grounded through a battery, *f*.

g g, &c., represent one series, and *g' g'*, &c., another series, of conducting-plates arranged in front of the strips *a*, and adapted to be electrically connected to such strip by other conducting-plugs similar to *d*. A line, *h*, containing a relay, *i*, is connected to each of the conducting-plates *g*, and is grounded through a battery, *k*.

m represents a local circuit, containing a battery, *n*, a call-bell, *o*, and having several branches, p' p^2 p^3 p^4, each of which contains an annunciator, *q*, a connection to one of the line-strips *a*, a plug, a conducting-plate *g'*, and the armature *r* of one of the several relays *i*.

Each subscriber's station on the several circuits is provided with a call-bell, *s*, a signaling-key, *t*, and a grounded telephone, *u*, with switch devices *v* for connecting in or cutting out the telephone. The signaling-key *e*, at the central station, is normally open, and in that position connects in a grounded telephone, *w*. In the normal condition of the apparatus of the system the telephones at the subscribers' stations are all cut out, and the conducting-strips *a* at the central station are in electrical connection by means of the conducting-plugs with the conducting-plates *g* and *g'*. When, now, any subscriber on either of the subscribers' circuits 1, 2, 3, or 4 wishes to be put in oral communication with any subscriber on either of the other circuits he breaks his circuit one or more times by means of his signaling-key *t*, thus causing a demagnetization of the core of the relay in that particular circuit at the central station, and causing the armature of the relay to be released and to make a back contact at *z*, thereby closing the local

circuit through the branch p', for example, causing the annunciator in that branch to drop and the bell to be rung. If it is desired that the bell should not be rung, it can be cut out by simply turning a switch, j, to contact j'. The operator at the central station having been apprised over which circuit the call has been made, first removes the plug from conducting-plate g, and then inserts it so as to connect the line-strip a with the bottom strip, b, thus connecting in his telephone w, after which he removes the plug from the appropriate conducting-plate g', so as to rupture the local circuit. Learning through his telephone with what other subscriber the person calling wishes to be put into communication, the central operator then removes the plug which connects him to the subscriber calling, and after removing the plug which connects the plate g' to the line-strip in the circuit of the subscriber to be called he places himself into connection with the latter subscriber by connecting the bottom strip, b, with the appropriate line-strip, and then with his signaling-key calls the subscriber up, and, receiving a response through his telephone, connects up the two subscribers, as will be readily understood. The conversation between the subscribers having ended, the apparatus is returned to its normal position, as before.

It will be observed that the signal-receiving mechanism of each line is independent of that of all the other lines, and that outgoing signals can be transmitted from the central office over any line without interfering with the signal-receiving apparatus on that or any other line.

In the arrangement shown in Fig. 2 a separate local battery for the signal-receiving apparatus is dispensed with, and the breaking of any subscriber's circuit causes the armature of the relay in that particular circuit at the central station to make back contact and shunt the line-battery into the local circuit.

If desired, the armature of the relay may itself act as an annunciator-drop, and, by dropping, not only close the local circuit, but also expose a number on its outturned face. Figs. 3 and 4 show arrangements embodying this idea. In Fig. 3 the armature n' itself constitutes the annunciator-drop, and when released by the demagnetization of the relay-core falls and makes contact at m', and shunts the line-battery or a local battery into a local circuit including a call-bell, while in Fig. 4 the annunciator-drop is made separate from the armature, but held normally elevated by a hook, o', on the end of the armature-lever.

While I have hereinabove shown and described a specific form of switch for a central office and one signaling-key thereat for all the lines and each circuit normally charged, it is evident that any of the well-known forms of switches for central stations may be employed, and also that the subscribers' circuits may be normally uncharged and the relays made to respond to currents generated at the outlying stations and to close on forward contacts to make operative the local circuit.

Instead of employing a signaling-key common to all the lines, a separate key may be employed at the central station for transmitting outgoing signals over each line, as shown in my patent, No. 224,653, dated February 17, 1880.

I claim as my invention—

1. In a telephone-exchange system, the combination, substantially as described, of a series of subscribers' circuits centering at a central station and each containing a relay with signaling devices in a local circuit operated by the relay and switch devices for connecting any two subscribers' circuits for oral communication.

2. In a telephone system, the combination, substantially as described, at a central station, of a series of subscribers' circuits centering thereat and each containing a relay with signaling devices in a local circuit operated by the relay and means for transmitting outgoing signals over the subscribers' lines without disturbing the signaling devices at the central station.

3. In a telephone-exchange system, the combination, substantially as described, at a central station, of a series of subscribers' circuits centering thereat and each containing a relay with signaling devices in a local circuit operated by the relays, means for transmitting outgoing signals over the subscribers' circuits without disturbing the local signaling devices, and switch devices for connecting any two subscribers' circuits for oral communication.

4. In a telephone-exchange, the combination, substantially as described, at a central station, of a series of subscribers' circuits centering thereat and each containing a relay with annunciators in a local circuit—one for each subscriber's circuit—and means for closing the local circuit by the operation of any one of the several relays, so as to operate the appropriate annunciator.

5. In a telephone-exchange system, the combination, substantially as described, at a central station, of a series of subscribers' circuits centering thereat and each containing a relay with a local circuit containing an annunciator for each subscriber's circuit and a call-bell common to all the subscribers' circuits and means for closing the local circuit by the operation of any one of the several relays, so as to operate the appropriate annunciator and sound the bell.

6. In a telephone-exchange system, the combination, substantially as described, at a central station, of a series of subscribers' lines centering thereat, each containing a relay and grounded through a battery, with a local circuit containing signaling or indicating devices, and the armatures of the relay, each operating, when released by the opening of the line containing its relay, to close the local circuit and shunt the battery into the same.

7. In a telephone-exchange system, the com-

bination, substantially as described, at a central station, of a series of subscribers' lines centering thereat and each containing a relay with a local circuit containing an annunciator for each subscriber's circuit, and a call-bell common to all the subscribers' circuits, and means for closing the local circuit by the operation of any one of the several relays, so as to operate the appropriate annunciator and sound the bell, and switch devices for cutting out the bell, when desired, without disturbing the annunciators.

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Witnesses:
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